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IMPRESSION MADE BY A STRANGER

As Seen From a Transcontinental Airplane Over Arizona

(See page 67)

Vol. XVIII

No. 486

Can Zaro Agha Convince Scientists?

Pseudanthropology

He Will Have a Hard Time Proving His 156 Years

THE OLD Turk, Zaro Agha, with his birth certificate showing 156 years of age, who is now being proclaimed to credulous New York as the oldest human in the world, will have a hard time convincing scientific skeptics that he has lived so many years.

Old he is, without a doubt, but those who have looked into such claims in the past are laying their scientific wagers that he is not much more than a hundred or so.

In fact, the most extreme case of longevity that medical records show fully authenticated was not quite 111 years. That record was substantiated by the English investigator, Dr. T. E. Young, who in the early part of this century considered close to a million cases of supposed centenarians and found only 30 persons who from other outside evidence could be shown to have lived a hundred years or more. Of the thirty, 21 were women and 9 were men.

Medical statisticians hold to their idea that extreme old age is a rare phenomenon although in the million or more deaths annually in the United States at least several hundred death certificates show ages of over a hundred and occasional ones will show such startling records as 120 years.

When such cases are looked into it is often found that mistaken identity confers upon the supposed centenarian his remarkable record. Repeatedly instances like this are uncovered: John Jones was born and his baptism duly recorded, but he died at the age of 15 years and through an oversight his death was not registered. In the same year that he died another male child was born to the same parents and named John Jones, perhaps in commemoration of his deceased brother. The second John Jones was never baptised. When he reaches the age of 85 or 90 his appearance of extreme senility attracts attention and the baptismal records apparently show

that he is a hundred or over. The aged gentleman basks in his seemingly well authenticated record of extreme age.

America has had its claimants to age records. Uncle John Shell of Kentucky who was exhibited as "the oldest living human being" with a claimed age of 131 years, was pronounced after a careful investigation of his case to be "about one hundred years old, possibly a year younger or older."

Despite the fact that authenticated cases of human longevity to over a hundred years are few, man is nearly the longest lived of all mammals. The common idea that whales and elephants attain many more years than man is not credited in scientific circles. But some species of fish may live to over 260 years according to the best evidence and reptiles are reported to have lived 175 years. Birds may have a life span of a few years longer than man in some instances.

Science News-Letter, August 2, 1930

Nation's Health Good

DESPITE the coming of dog days with their attendant discomforts, the health of the people throughout the nation generally is unusually good, according to reports received by the U. S. Public Health Service. The only exception to the favorable reports, is a record of a slight increase in infantile paralysis in California. The last weekly report from that state showed 99 cases, which was an increase of ten cases over the week before. Public health officials pointed out, however, that that is a very small number for a state the size of California.

Reports to date do not show whether the recent extreme heat has affected health in general.

Public Health

Science News-Letter, August 2, 1930

The Answer Is

In This Issue

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Preservative from Milk

A SUCCESSFUL, non-poisonous food-preservative may be obtained from cow's milk as a result of recent investigations reported by Drs. F. S. Jones and H. S. Simms of the Rockefeller Institute for Medical Research at Princeton, N. J.

These scientists were able to isolate the natural agent in milk which prevents the growth of micro-organisms. It is found in the whey after the routine separation of the butter-fat and casein. It can be obtained in pure form in a powder which keeps for several months. One grain of this powder added to a gallon of the ordinary medium on which germs grow will prevent their growth, it is reported.

Biochemistry

Science News-Letter, August 2, 1930



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The largest stone messenger from the heavens and the largest meteorite of any kind ever seen to fall, and recovered. Weight, 820 pounds. Iron meteorites weighing many tons have been found.

Shooting Stars, The Story-Tellers of The Universe

Astronomy

By PROF. CHARLES P. OLIVIER
Director of the Flower Observatory,
University of Pennsylvania

Of fortunate rarity are celestial visitors like the huge meteoric mass that dug the famous Meteor Crater in Arizona about 2,000 years ago. This scar on the face of the earth near Winslow, Ariz., is four-fifths of a mile across and 450 feet deep. It is shown on our cover this week in a photograph taken recently for Science Service from a transcontinental airplane.

Far more common are the shooting stars that are seen every clear night but are especially numerous in August. In this article, which was given as a radio talk under the auspices of Science Service through a nation-wide network of the Columbia Broadcasting System, a distinguished meteor authority tells the interesting story of these August meteors and how your observation of them can greatly aid scientists.

EVERYONE has frequently seen a shooting star or meteor, but few people know what they are. Even in our own supposedly educated country many persons still think meteors are real stars that have somehow broken loose from their moorings and taken a sudden journey across the sky. It is fairly safe to say that many other people do not take time to think about them at all, any more than they do about the fireflies of a summer night, which are sometimes mistaken for meteors.

However, there are many others—and I believe the growing majority—who have a real desire to know about the phenomena of nature. They want to know the causes and effects of what they see.

Supposing, therefore, that the audience of this afternoon is made up largely of such persons, the speaker will attempt to give a few facts about meteoric astronomy, especially those which may be of interest to amateurs. And there is no science which has a larger group of enthusiastic amateurs than astronomy.

Before going further it should be said that the reason this talk is being given at this time is because the month of August is, of all months in the average year, the one during which most meteors are likely to be seen.

The explanation is of course that the Earth, in its annual path around the Sun, passes through some regions of space where it meets more meteors than elsewhere. August is the month when we run into the densest part of that meteor stream known as the Perseid. Some Perseids may be seen every clear night after July 20 and up to August 16. Their greatest numbers are seen on the nights of August 11 or 12, usually the former date. On this night, if the Moon is not shining, and one watches from a place with unobstructed view, and the sky is perfectly clear, sometimes over 100 meteors per hour may be seen.

The Debris of Evolution

However, nearness to the lights and smoke of a city, the least fog or haze, or moonlight, will any one of them cut down the numbers seen greatly, for naturally there are more fainter than brighter meteors, and the former are those not visible unless the sky is very clear.

Persons desirous of seeing the Perseids should therefore try to observe from a favorable place in the country. This year, unfortunately, the Moon will be full on August 9, hence it will still be very bright on August 11 and 12. Nevertheless, it will be in the far south, while the Perseid radiant rises in the northeast and will be on the meridian, overhead, by dawn. So all fairly bright Perseids in the northern half of the sky will be readily visible.

Returning to meteors in general, they may be defined as the debris of evolution. For instance, after a great building has been constructed, all sorts of waste material are found, pieces of stone, brick, wood, scraps of steel, nails, etc. So after a solar system of planets and satellites, asteroids and comets, has been formed, waste material is left over. This becomes meteors. But a study of the scraps of material around a building would teach a man who was not al-

lowed to see the edifice itself something about the completed structure. So the study of meteors leads to most important conclusions as to the evolution of the Solar System—and other similar systems in space.

Meteors are in general small bodies, far smaller than is generally thought. The faintest we see with the naked eye are probably no larger than a grain of sand, the larger ones may be as large as a boy's marble. Great fireballs, which are occasionally seen, are due to bodies of a few hundred pounds weight at most.

The Danger of Meteors

The average meteor is luckily destroyed by its passage through our atmosphere. Were it not so the Earth would be uninhabitable, for 20 million (not counting vastly more numerous telescopic meteors) enter our atmosphere daily. They move with velocities of from about eight to 50 miles per second. A grain of sand moving with such a velocity would kill as surely as a shell from a rifled cannon, if it hit a vital spot. It would in any case certainly go right through the body of whoever was hit.

But the air, which extends upwards at least 200 miles, forms an elastic but impenetrable shield to most meteors. Only the largest get through, and these are so infrequent that we need scarcely fear them. When a meteor does penetrate to the Earth's surface, it is called a meteorite. A few are found yearly, but there are few if any authentic accounts of a fatality therefrom. It is true that a big one did nearly strike two children in Hungary, some years ago. It fell through the ceiling of the room they were in, but did not harm them though smashing up everything else.

Again, four small stones fell in the neighborhood of a negro funeral procession about five years ago in Virginia. Except for a great scare among the mourners no damage was done. The speaker has handled these stones; they are about the size of a large orange and weigh only a few pounds each. Almost all large scientific museums have some meteorites on exhibition. The largest now in captivity may be found in the American Museum of Natural History in New York City. One weighs over 36 tons, is mostly of iron, and was (along with two somewhat smaller ones) brought back by Peary from Greenland. Their fall is not recorded, even in the traditions of the Eskimos, but their meteoric origin is quite certain,

proved as it is by their locality and internal structure.

An even larger one has recently been found in southwest Africa, but no attempt has been made to move it. One still larger, of almost incredible dimensions as meteorites go, was reported a few years ago by a French military column, operating in the desert region of Morocco. The speaker has in vain sought to obtain further details about this object. Failure was probably due to the disturbed



Prof. Olivier, at his telescope in the Flower Observatory of the University of Pennsylvania. He thinks many of the meteors which bombard the Earth continually are fragments from other solar systems.

condition of that country, and the unwillingness of the French to penetrate again into any battle region without imperative cause. But we all eagerly await more news about this monster.

If a person is in the open country with a clear sky, during the first six months of the average year, he should see from four to eight meteors per hour; during the second six months from eight to 15 per hour. Also he will see fewest at six p. m., most about two hours before sunrise. This rule holds all the year. This last fact is due to a question of relative velocity, a geometrical or physical problem fully understood. The smaller

numbers met in the first half of the year is obviously explainable by the mere fact that there are less meteors to be met in the regions then traversed by the Earth, as well as to the position of the meteoric apex as seen in the northern hemisphere. Again the richest annual showers come in the second half of the year, for instance: Delta Aquarids in late July, Perseids late July and August, Orionids in October, Leonids and Bielids in November, Geminids in December.

Meteors come to us from two sources, some from our own Solar System, others from outer space. A sharp line can be drawn between them, for if a meteor passes our orbit with a velocity much under 26 miles per second, it is a home product, as it were. But if the velocity is over 26 miles per second it originated in some distant stellar system, and has traversed immeasurable reaches of space to come to us.

Visible Only in Atmosphere

Of course we see none of the innumerable meteors that pass us by closely, much less those at a distance. Only when the meteor plunges into our atmosphere does it become visible, due to the sudden turning of its great kinetic energy of motion into light and heat. Even then the most of its light and apparent size come from the envelope of superheated air which it carries along with it. For instance, the speaker has seen more than one fireball which had the apparent size of one half the Moon's diameter, *i. e.*, 15', or approximately 1/230 of a radian. Therefore if the object was 50 miles away—and it was actually farther—that would mean the fireball was 1150 feet in diameter. Probably the solid mass was of the order of one foot, not 1150. Then the extra apparent size was due to heated gas around it, and also to a lesser extent to irradiation.

The beautiful trains left by some bright meteors were once thought to be actual sparks left behind. We now know such an explanation is absurd, for some of these remain visible a quarter of an hour or more. It appears most probable that they are due to phosphorescence. The long enduring ones seem sharply limited to the stratum between 45 and 65 miles above the ground. They do not last long higher up, and those very much lower are actual trains of smoke, which show up by reflected sunlight. These latter are seen only after the passage of a great fireball (*Turn to page 76*)

Look Out For The Rainmakers

Meteorology

Hot Weather and Drought Brings Them Out

WITH ONE of the most general droughts ever experienced in the United States now threatening all kinds of crops, it is likely that the "rainmaker" will come into his own, taking advantage of the desperate straits of the farmer to fill his own pocket. For the rain-maker really bets on a sure thing. If he fails, his losses are practically negligible, but if rain does follow his efforts he takes full credit for it, and the cash as well. Many real scientific experiments have been made to test rain-making methods, but have never yielded the slightest evidence that anything man can do has any effect on starting or stopping precipitation.

Dr. David Starr Jordan, president emeritus of Stanford University, once exposed the rain-maker and his methods, showing how effective they are, as a means of making easy money.

He works it this way. He goes to an ordinarily prosperous farming region where a long continued drought threatens heavy losses and puts up to the farmers a proposition like this:

Their Proposition

"If rain doesn't come soon you farmers in this neighborhood may lose hundreds of thousands of dollars. Now with my secret method I can surely bring rain. It will cost a lot to do it, so I'll have to charge you \$10,000 for my services. But to show you that I am perfectly fair, I will not charge you if I fail. We'll sign a contract that if I bring an inch of rain here within the next two weeks you will pay me \$10,000, which is much less than you'll lose if rain doesn't come. In the inconceivable event that I cannot bring rain, you won't have to pay me anything, so you have everything to gain and nothing to lose."

Such a proposition as this looks perfectly fair and the farmers accept it. The rain-maker then proceeds to set up his apparatus, which may resemble a huge cannon pointing upwards, in which he sets off some explosions. Or he may have some large caldrons, in which he brews a mysterious mixture that gives off lots of impressive smoke. Just what method he uses is immaterial, since it has nothing to do with the rain. Its sole function is to impress clients, and this

Can cannon and brewing chemicals bring rain? Meteorologists say, No! But when drought threatens the destruction of crops, so-called rain-makers continue to collect thousands of dollars from owners of parched fields in the arid Southwest.

can be done at a cost of a very few dollars.

No drought lasts forever, and the longer it has continued the more likely rain is to come. So perhaps it starts a few days after he begins his manipulation. The rain-maker announces that he has brought it, collects his \$10,000, or whatever figure he has set, and goes on his way to some other drought-stricken section. If the drought does continue, and the end of the specified time sees no precipitation, he packs up and goes his way without any payment, unless he can get his contract continued. Even if he cannot, his only expenditure has been his time and a few dollars for chemicals.

Since it is merely a matter of chance whether or not rain follows the efforts of the rain-maker, he would probably win about half the time. And \$10,000 for a couple of weeks' work is good pay, even if he only works at that price for a month or so a year. To be really fair, he should offer the farmers a forfeit of \$10,000 if he fails. But no rain-maker has ever been known to do that.

What Causes the Heat

HOT AIR from Texas, and the neighboring states in the southwest, is the cause of the heat wave from which most of the United States east of the Rockies has been suffering. This heat wave, though rather unusually severe, is typical of the usual progress of such a wave, according to Dr. C. L. Mitchell, of the U. S. Weather Bureau.

The southwestern states remain continuously hot in the summer, but ordinarily the influx of cold air from Canada and the Northwest confines it to those states. But when this high pressure area over the north Pacific fails to send the cold air over the

mountains and down the Mississippi Valley, the high pressure over the southwestern states forces the hot air northwards. As it moves it is heated by the long hours of sunshine in the day, and the short nights do not give it time to lose the heat it gained in the daytime, so the temperature increases.

Thus, in the course of two or three days, the Middle West is in the grip of a hot wave. As the hot air encounters a high pressure area to the north, it is forced eastwards, and so the Middle Atlantic states experience it several days later. It takes roughly a week for the hot air to travel from the Texas region to New York. This process is typical, and has taken place with the latest heat wave. The one a few weeks previously, however, was somewhat different. A high pressure area in Canada came into action sooner than ordinarily and forced the hot air to the southeast, bringing abnormally high temperatures to the South Atlantic states, while those farther north enjoyed the cool air from Canada.

The Break-up

The break-up of a heat wave such as this comes when cool air from the north sweeps in to take its place. As the cool air encounters the war circulation is set up which results in local thunderstorms. These are, therefore, not the cause of the cooling, but another manifestation of the process that does cause it.

Such heat waves occur frequently during the summer, though fortunately they are not all as severe as the last one, which brought an all-time high temperature record to Washington, D. C., with 106 in the shade. Sometimes they are much more prolonged, like the famous one in 1901 that began late in June and continued with hardly a break until almost the end of July. At many towns in Missouri, Kansas and Nebraska the temperature rose to above 100 degrees nearly every day in this time, and sometimes reached 110. Such a heat wave causes immense damage to the crops. One in 1894 was estimated to have caused more than \$50,000,000 worth of damage in Iowa alone.

Rare Gases of the Atmosphere

—A Classic of Science

Chemistry

THE RECENTLY DISCOVERED GASES AND THEIR RELATION TO THE PERIODIC LAW. By William Ramsay. An address delivered before the Deutschen chemischen Gesellschaft, December 19, 1898. Translated by "J. L. H." Printed in Science, February 24, 1899.

GENTLEMEN: It is well known to you all how the remarkable observation of Lord Rayleigh that nitrogen from the atmosphere possesses a greater density than that prepared from ammonia or nitrates led to the discovery of argon, a new constituent of the air. I need not say that had it not been for this observation the investigations of which I shall speak this evening would never have been carried out, at least not by me. You also, doubtless, will remember that the search for some compound of argon was rewarded, not by the attainment of the quest, but by the discovery, in clèveite and other rare uranium minerals, of helium, an element whose existence in the chromosphere of the sun had already been suspected. And, further, I hardly need to recall to your minds that the density of helium is in round numbers 2, and that of argon 20, and that the ratio of specific heats of both these gases, unlike that of most others, is 1.66.

From these figures it follows that the atomic weight of helium is 4 and that of argon 40. It is true that in many quarters this conclusion is not admitted, but I have always thought it better to recognize the validity of the theory of gases and accept the logical deduction than to deny the truth of the present theories. The only reason for not admitting the correctness of these atomic weights is that that of argon is greater than that of potassium, but this is no severer attack upon the validity of the periodic law than the accepted position of iodine after, instead of before, tellurium. As a matter of fact, all the more recent determinations of the atomic weight of tellurium give the figure 127.6, while that of iodine remains unchanged at 127.

Since these new elements form no

The end of the Nineteenth Century brought many surprises in the field of physics and chemistry. Several old theories went by the board, and the discovery of a set of new elements with absolutely no chemical properties threatened for a moment to jeopardize Mendeleeff's periodic law. Ramsay therefore watched with some anxiety the determination of atomic weight of his new gases, and was gratified to find them falling regularly into place among the older elements, bringing new harmony into the periodic table.

compounds, it is not possible to decide the question by purely chemical methods. Were it only possible for us to prepare a single volatile compound of helium or of argon our problem would be solved. In spite of many attempts, I have not been able to confirm Berthelot's results with benzene or carbon bisulfide. I have, however, offered to place a liter of argon at the disposal of my distinguished colleague, that he may repeat his experiments on a larger scale. No one can doubt that it is exceedingly desirable that the question of these atomic weights should be finally decided, and that by chemical methods.

In order that the subject may not depend wholly on physical theories, I have considered it from another standpoint. If we assume, as from countless chemical facts we are fully justified in doing, that the periodic law is true, then, giving helium the atomic weight 2 and argon 20, there is no possible place for an element of their mean atomic weight; for, unless we absolutely overturn the accepted views, there is no vacancy in the table for such an element. This appears from the following portion of the tables:

H = 1 He = 2(?) Li = 7 G1 = 9.2 B = 11 C = 12 N = 14 O = 16 F = 19 A = 20(?)

It is true there is space enough between He = 2 and Li = 7, but it is highly improbable that an element belonging to the argon series could have so low an atomic weight. The difference between adjacent members of the same group of elements is generally from 16 to 18 units, but here such a difference is wholly excluded. If, on the other hand, we assume He = 4 and A = 40, it would be, in

my opinion, by no means improbable that such an element could exist whose atomic weight would be somewhere about 16 units greater than that of helium, and consequently 20 units less than that of argon. The discovery of such an element would be, therefore, not only a proof of the correctness of 40 as the atomic weight of argon, but also a confirmation of the present views regarding the significance of the specific heats of gases for their molecular weight.

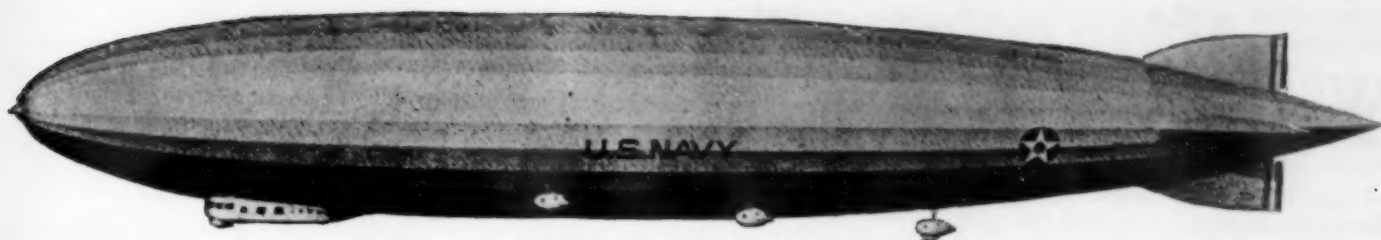
A glance at the periodic table will make these considerations clear, for in the latter case we have the following series:

He = 4, Li = 7, G1 = 9.2, B = 11, C = 12, N = 14, O = 16, F = 19, (?) = 20, Na = 23, Mg = 24.3, Al = 27, Si = 28, P = 31, S = 32, Cl = 35.5, A = 40.

Shortly after the discovery of helium I began the search for this suspected element at atomic weight of about 20, at first in connection with Doctor Collie, my former assistant, and later with my present assistant Doctor Travers. . . .

[A large number of experiments were performed trying to extract gases from minerals with no result.—Ed.]

OUR patience was now well-nigh exhausted. There seemed, however, to be a single ray of hope left, in an observation which had been made by Dr. Collie and myself. You will recall that the atomic weight of argon was apparently too high; at all events it would be more in harmony with the periodic law if the density of argon were 19 instead of 20, and hence its atomic weight 38 instead of 40. Hence, after some fruitless attempts to separate argon into more than one constituent by means of solution in water, we undertook a systematic diffusion of argon. We did not, however, carry this procedure very far, for, at that time, we believed that helium was a more probable source of the desired gas; nevertheless, we found a slight difference in density between the gas which diffused first and that which remained undiffused. We, therefore, decided to prepare a large quantity of argon,



and, after liquefying it, to investigate carefully the different fractions on distillation.

Such an operation demands much time. In the first place, the necessary apparatus is not to be found in any ordinary chemical laboratory; the preparation can not be carried out in glass tubes in an ordinary furnace, but requires iron tubes of large size and an especial furnace; in the second place, the operation must be repeated several times, for it is not convenient to work with an excessively large quantity of magnesium. As before, we removed the oxygen from the air by means of copper at a red heat; the atmospheric nitrogen remaining was collected in a large gasometer holding about 200 liters; after drying over concentrated sulphuric acid and phosphorous pentoxid, the gas was passed through an iron tube of 5 centimeters diameter filled with magnesium filings; the gas was then passed through a second copper oxid tube to remove the hydrogen; it then entered a galvanized iron gasometer, which was constructed like an ordinary illuminating gas gasometer, in order that the argon should come in contact with as little water as possible, since argon is quite appreciably soluble in water, and, had the ordinary form of gasometer been used, much would have been lost in this way. Again, the gas had to be led over hot magnesium to reduce still further the quantity of nitrogen; and, at last, it was circulated between the gasometers, passing on its way through a mixture of thoroughly heated lime and magnesia at a red heat. This is a means of absorption, recommended by Maquenne, to remove the last of nitrogen. Since, however, it is not possible to dry the lime absolutely, hydrogen is taken up by the gas, and this must again be removed by copper oxid, in order that all the hydrogen may be burned, after which the water must again be removed by drying tubes.

These operations required several months and were chiefly directed by Dr. Travers. . . .

The airship "Los Angeles" is inflated with Helium, one of the rare gases, discovered by Lockyer in the sun and by Ramsay on earth. Of the other rare gases, argon fills electric light bulbs, neon glows rosily in electric bulbs for television apparatus, and all the gases contribute the colors of their spectra to the brilliant new advertising signs which decorate our streets.

[After proving that the gases under investigation formed no compounds with any of the chemicals used in this purification process, the most hopeful line of investigation seemed to be refrigeration of the argon residue with liquid air.—Ed.]

DR. HAMPSON, the inventor of a very simple and practical machine for the preparation of liquid air, which is based upon the same principle as that of Herr Linde, was so kind as to place large quantities of liquid air at my disposal. In order to become acquainted with the art of working with so unusual a material, I asked Dr. Hampson for a liter; with this Dr. Travers and I practiced and made different little experiments to prepare ourselves for the great experiment of liquefying argon.

It seemed to me a pity to boil away all the air without collecting the last residue; for, though it seemed improbable that the looked-for element could be here, yet it was, indeed, possible that a heavier gas might accompany the argon. This suspicion was confirmed. The residue from the liquid air consisted chiefly of oxygen and argon, and, after removing the oxygen and nitrogen, beside the spectrum of argon were two brilliant lines, one in the yellow, which was not identical with D_3 of helium, and one in the green. This gas was decidedly heavier than argon; its density was 22.5 instead of the 20 of argon. We had, therefore, discovered a new body, which was an element, for the ratio between the specific heats was 1.66. To this element we gave the name "krypton." Up to this time we have not followed further the study of

this element; we have, however, collected and preserved many residues which are rich in krypton. It was, however, our first intention to examine the lightest part of the argon. In many, however, we remarked, in passing, that the wave-length of the green line of krypton is exceedingly close to that of the northern lights, being 5,570, while the latter is 5,571.

Our whole supply of argon was now liquefied in the following manner: The gasometer containing the argon was connected with a series of tubes in which the gas passed over respectively hot copper oxid, concentrated sulphuric acid, and phosphorous pentoxid; it then passed by a two-way cock into a small flask, holding about 30 cubic centimeters, which was enclosed in a Dewar tube. By means of the other opening of the cock, the flask was connected with a mercury gasometer. By means of a U-shaped capillary and mercury trough, it was also possible, through a three-way cock, to collect the gas at will in glass tubes. About 50 cubic centimeters of liquid air were poured into the double walled tube, and, by means of a Fleuss air pump kept constantly in action, the liquid air boiled at 10 to 15 millimeters pressure. The argon liquefied rapidly as soon as subjected to this low temperature, and in the course of half an hour it was completely condensed. Altogether there were about 25 cubic centimeters of a clear, limpid, colorless liquid, in which floated white flakes of a solid substance. By stopping the pump the pressure over the liquid air was now increased, and the argon boiled quietly, the first portions of the gas being collected in the mercury gasometer. Changing now the three-way cock, the largest portion of the argon passed back into the iron gasometer; after nearly all the liquid had boiled away and only the solid substance was left in the flask, the last portions of the gas were collected separately. The solid substance remained persistently in the flask; it was slowly volatilized by means of a Töpler

pump, which stood in connection with the apparatus.

WE first directed our attention to the lighter fractions, for these had for us the greatest interest. The density of this gas was found to be 14.67; the ratio between the specific heats was as usual 1.66, and the spectrum showed, beside the well-known groupings of argon, a large number of red, orange, and yellow lines of varying intensity. Evidently we had before us a new element, which was contaminated with argon.

This gas was then liquefied in a similar apparatus to that first used, but constructed on a smaller scale; a portion, however, remained uncondensed. Even by raising the reservoir of the mercury gasometer until an overpressure of an atmosphere was reached, it was impossible to convert all the gas into a liquid, although the temperature of the boiling air was reduced as low as possible by rapid pumping. By repeated raising and lowering of the reservoir we finally passed all the gas through the cooled space, in order to free it, as far as possible, from argon. The uncondensable gas was collected by itself, and the remainder was evaporated into another gasometer.

One can well imagine how eager we now were to know what the density of this gas would prove to be. It was immediately weighed. Our satisfaction will be realized when we found that its density was 9.76. Since, however, its spectrum at low pressure still showed argon lines, though weak, we were compelled to admit that this number was certainly too high. It was impossible that this gas should not contain argon, since at the temperature used argon possessed a measurable vapor pressure.

We have, therefore, estimated that the density of the pure gas is 9.65. Here our work for the time was ended by the beginning of the summer holidays.

Neon, the New Gas

On our return we resumed the study of this gas, which we will hereafter designate by its name of "neon." Its spectrum was photographed by Mr. Baly, one of my assistants, by means of a spectrometer which we had constructed during the vacation. To our astonishment, the lines of helium were easily recognized. A comparison photograph showed this beyond all question. Hence the density of the gas was in all proba-

bility too low, owing to the presence of the helium. Since now the temperature used was insufficient to liquify the neon, and since the argon had been removed as far as possible, we had to face the problem of how one could free neon from its accompanying impurities. A means was found in its solubility. It is well-known that the solubility of those gases which do not react chemically with the solvent follows in general the same order as their condensibility. According to this helium should have a lesser solubility than neon, and neon than argon. The solubility of these gases in water is, however, too slight to be available for their separation. We have, therefore, used liquid oxygen as a solvent. This mixes with all three gases and boils at a temperature not far from the boiling point of argon. We therefore mixed the gas with sufficient oxygen to be almost wholly condensed at the temperature attained by boiling air at the lowest pressure. The uncondensed portion, about one-fifth of the whole, was separated and collected as that richest in helium; the middle portion we considered as purified neon, while the remainder consisted of a mixture of argon and neon; naturally, all these portions contained oxygen in larger or smaller quantities.

After the removal of the oxygen, which was accomplished by passage over hot copper filings, we determined the density and refractivity of the middle portion. The density in two determinations was 10.04 and 10.19; the second figure was obtained after passing the electric spark through the gas mixed with oxygen in the presence of caustic potash and subsequent removal of the oxygen by phosphorus. The entire quantity weighed was only 30 cubic centimeters at a pressure of 250 millimeters. The weight was 0.0095 gram. I mention these figures in order to show with what an exceedingly small quantity of gas it is possible to carry out a very satisfactory density determination.

The refractivity of this portion with reference to the air as unity was 0.338. This portion still showed the spectra of argon and helium, and was, therefore, submitted to a second purification, in which the heavier part was more completely removed than the lighter. Even this purification, however, did not remove all the argon, but its quantity was decidedly diminished. The density was somewhat diminished, and helium was stronger

in the spectrum. The entire amount of neon had become, by these operations, so divided up that it was not possible to carry out a further purification without preparing a greater quantity of crude neon. On this Dr. Travers and I are at present engaged.

In the meantime Mr. Baly has made exact measurements of the lines of the neon spectrum, at the same time eliminating all the lines which belong to argon and to helium by superposed plates. The values were compared with iron lines photographed upon the same plate, and the measurements were carried out by means of different pairs of these known lines. . . .

Up to the present we have had little time to study thoroughly the other companion of argon in the atmosphere. Dr. Travers and I have, however, worked upon it. . . .

Krypton, the Hidden Gas

As regards krypton, which is distinguished by three brilliant lines, one in red, one in yellow and one in green, we are in much the same position. We have collected a considerable quantity of the impure gas, which shows the spectrum finely, although that of argon is also present. We hope that we shall soon be able to pursue this portion of our work further. We can merely note here that the specific gravity of the gas which shows this spectrum in such a marked way is not far different from that of argon.

The heaviest of these gases we have weighed, although in impure condition. Its density is 32.5. I need not call your attention to the fact that there is space for an element of the helium group between bromine and rubidium. Such an element should have an atomic weight of 81 to 83, which corresponds to a density of 40.5 to 41.5, under the very probable supposition that, like the other gases of this group, it is monatomic. The spectrum of this gas, which we have named "xenon"—the stranger—has many lines; none of these are of marked intensity, and in this respect the spectrum resembles somewhat that of argon. It is also analogous to argon in another particular, that the spectrum undergoes a remarkable change when a Leyden jar is put into the circuit. As with argon, many new blue and green lines appear, while other lines, mostly in the red, either disappear or lose much of their intensity.

IN VARIOUS SCIENCE FIELDS

1,325 Radio Arrests

RADIO receiving sets in automobiles may please the man who doesn't like to miss the five to six p. m. program, but they are becoming hated objects of dread to the hijacker, holdup man, and petty thief.

Twenty-five leading cities now have their police cars equipped with sets to receive messages from headquarters on short wavelengths, with the result that in the city of Detroit alone in 1929, 22,598 messages were sent to police cars, of which 8,288 were actual emergencies. As the result of these messages, 1,325 arrests were made, and in many cases the criminal was caught before he had left the scene of the crime.

Radio

Science News-Letter, August 2, 1930

"No Smoking"

"NO SMOKING" as the rule for all tourists to wooded areas where there is danger of forest fires is urged by George D. Pratt, president of the American Forestry Association. The unprecedented drought of recent weeks has left the forests in a highly inflammable condition, so that a single cigarette or burning match carelessly thrown away might start a fire of enormous proportions, he said.

As recent reports show that half of all forest fires are caused by smokers, strict observance of the no smoking rule would greatly reduce the danger. Mr. Pratt suggested that if such cooperation is not given, it may be necessary to close many of the forests to tourists, and this has already been done in several national forests in Washington and Oregon. He stated that the condition is the most critical in years, and that the disastrous fires of 1929, the worst in 19 years, followed drought less severe than the present one.

In the meantime, the U. S. Bureau of Standards is preparing to make experiments towards developing a "non-inflammable" cigarette that will go out as soon as discarded. What is needed is some process of accomplishing this without injuring the taste of the cigarette. Efforts made in the past to secure the cooperation of the manufacturers to make their products less of a fire menace were not suc-

cessful, because all the processes suggested affected the taste or raised the cost, and it was feared that sales would be adversely affected.

Forestry

Science News-Letter, August 2, 1930

Elm Disease Here

THE DUTCH elm disease, a fungus blight that has caused serious damage to elm trees in Holland and has spread into other European countries, has been discovered in Ohio. Three trees in Cleveland and one in Cincinnati have been definitely identified as harboring the disease and destroyed.

Its symptoms are sudden wilting, followed by yellowing and dropping of the leaves. Death of the tree follows, either at once or after a few years of struggle. No cure is known.

The disease is caused by a fungus known as *Graphium ulmi*. It is related to other fungi already known in this country, which have made themselves more or less troublesome as timber stainers, but so far not as killers of trees.

The Ohio Agricultural Experiment Station at Wooster, Ohio, has established a laboratory for the study of the elm disease. The scientists in charge desire to have specimen branches of any elm trees showing suspicious symptoms sent to them.

Plant Pathology

Science News-Letter, August 2, 1930

Florida Fruit

FLORIDIANS are spraying ardently and hopefully this summer, with the aim of ending or at least strongly modifying the federal fruit fly quarantine by autumn. Secretary of Agriculture Hyde recently intimated that unless events took an unexpectedly unfavorable turn a modification in the regulations might be looked for, and this has encouraged growers, even those who were skeptical about the very existence of the pest, to take part in the eradication campaign. The Florida Clearing House has offered to distribute, free of cost, the necessary spray materials.

Entomology

Science News-Letter, August 2, 1930

Influenza

ABOUT 250,000 deaths resulted from influenza epidemics in this country between January, 1920 and the middle of 1929, the U. S. Public Health Service has just reported.

This total is nearly half that of deaths in the United States during the great epidemic of 1918-19. The last epidemic of 1928-29 accounted for about one-fifth of the quarter-million deaths, or 50,000, while another 100,000 occurred during the sharp epidemic of the spring of 1920.

Medicine

Science News-Letter, August 2, 1930

Aluminum Gas Trucks

GASOLINE tank trucks, lightened by tanks made of an aluminum alloy instead of heavier steel, may come into use to permit the transportation of larger pay loads of motor fuel.

But before they can be put on the highway the new 150 gallon aluminum tank compartments must prove their worth in tests which they will be given at New Kensington, Pa., the latter part of this month.

Water will be forced under pressure into one compartment until it bursts. Another will be filled with water and dropped 25 feet. Two will be licked by the flames of a gasoline fire.

Materials Testing

Science News-Letter, August 2, 1930

Also Vitamin "C"

FOR SOME years it has been known that celery contains vitamin A and B. Recent research has shown that it also contains a comparatively large amount of vitamin C, the "fresh fruit" anti-scorbutic vitamin.

This result has been obtained by Dr. Tomiji Matsuoka who carried out his experiments at the Kyoto Imperial University, Japan. Guinea pigs were used as the experimental animals. A basal diet was given on which the guinea pigs all got scurvy. This could be cured or prevented by a small daily ration of celery stalk or leaf.

Physiology

Science News-Letter, August 2, 1930

Weather and Aviation

MORE than most other common forms of transportation, travel by air depends on the weather. The transport pilot must have constant reports of weather along his route, so he can avoid local storms, or keep to the ground if the stormy area is too great. For this reason the U. S. Weather Bureau and the large air transport companies have cooperated in keeping constant track of weather conditions.

Dr. W. J. Humphreys, professor of meteorological physics at the U. S. Weather Bureau, author of "Physics of the Air" and a number of popular books on the weather, will give a radio talk on the timely subject "Weather and Aviation" on Friday, August 8 at 2:45 p. m., eastern standard time. This will be one of the series of radio talks by prominent scientists arranged by Science Service.

It will be presented through the following stations of the Columbia Broadcasting System: WWNC, Asheville; WPG, Atlantic City; WCAO, Baltimore; WLBZ, Bangor, Me.; WBCM, Bay City, Mich.; WNAC, Boston; WMAK, Buffalo; WBT, Charlotte, N. C.; WDOH, Chattanooga; WKRC, Cincinnati; WAIU, Columbus; KLZ, Denver; WDAY, Fargo, N. D.; WHP, Harrisburg, Pa.; WFBM, Indianapolis; KMBC, Kansas City; KLRA, Little Rock; WREC, Memphis; WISN, Milwaukee; WCCO, Minneapolis-St. Paul; WLAC, Nashville; WABC and W2XE (short wave), New York; WTAR, Norfolk; KFJF, Oklahoma City; WCAU and W3XAU (short wave), Philadelphia; WDBJ, Roanoke, Va.; KDYL, Salt Lake City; KSCJ, Sioux City, Iowa; KFPY, Spokane, Wash.; WFBL, Syracuse, N. Y.; KVI, Tacoma, Wash.; WSPD, Toledo; WIBW, Topeka, Kans.; WMAL, Washington; WMT, Waterloo, Iowa; WORC, Worcester, Mass.; and WKBN, Youngstown, Ohio.



Cypress Trees Below Water Line Resemble Huge Pop Bottles

HOW Hop-o'-My-Thumb might have felt if he had strayed into a modern bottling works is portrayed by Prof. Herman Kurz, of the Florida State College for Women, in telling of his experiences on the floor of a southern cypress pond that suddenly went dry and made it possible for men to walk on the bottom, twelve feet below the mark where they usually row in boats.

The great buttressed trunks of the trees stood up around them like enormous pop bottles, some of them bulging, then constricting, then flaring again at their roots exactly like the bottles of one of the most widely advertised soft drinks. Prof. Kurz tells of the discovery in the current issue of *American Forests and Forest Life*.

Some Were Empty

Some of the "bottles" were empties; for Prof. Kurz found holes broken in them, showing that the trunks were hollow. Some of them, where the water was shallow, stood in round mats of sphagnum moss, in which many cypress seedlings were sprouting. Some had "fairy rings" of outgrowths from the roots, or "knees" growing around them.

The great swellings that appear on the trunks of cypresses, increasing their underwater diameter to three or four times normal, are believed to be due to the need of the submerged roots for air. They do not develop when the trees are transplanted young to well-drained upland soils.

Ordinarily, because of prevailing

high water levels, it is not possible to study the lower parts of cypress trunks. Prof. Kurz was fortunate in finding a pond that had gone completely dry. When he returned to the place a couple of weeks later it had been refilled again, probably from some subterranean watercourse.

Botany

Science News-Letter, August 2, 1930

Overweight Danger

OVERWEIGHT plays rather an important part in diabetes and should be guarded against from early youth, Dr. Henry J. John of the Cleveland Clinic has reported to the Association for the Study of Internal Secretions. Dr. John's conclusion was drawn from statistical studies.

The weights of 528 diabetic persons were compared with the weights of a large series of insured, consequently normal, persons. The overweight of the diabetics increased with each subsequent decade, he found. The normal persons, when compared with the diabetics, showed only a slight rise in weight with each ten years of life, thus contrasting sharply with the diabetics. The overweight among the diabetics was as much as 210 per cent.

The warning against overweight should not be started with middle-aged patients in the physician's office but with children in school, where care of health should be rightfully taught, if the ideal of preventive medicine ever is to be obtained, he said.

Public Health

Science News-Letter, August 2, 1930

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Psychology Can Aid Law Enforcement

Psychology

Commission Minus Psychologist Called Paradox

THE EXISTENCE of a National Commission of Law Enforcement without a psychologist in its membership is a "paradoxical spectacle," declared Dr. Knight Dunlap, professor of experimental psychology at the Johns Hopkins University, in a radio address. Dr. Dunlap spoke under the auspices of Science Service through a nation-wide network of the Columbia Broadcasting System, on the subject, "What is Psychology Good For?"

"In respect to the general application of laws there is a field in which psychology can be of immense service to the public, but this work has not even commenced," he said. "But," he added, "I don't know where we would find a psychologist today properly trained for this special work."

In Legal Procedure

"In the field of legal procedure there has been great interest in the applications of psychology," he continued. "Particularly, since psychiatry has shown itself such a dismal failure in this field. Unskilled attempts to treat the prisoner as a psychological problem and to cure him, instead of punishing him, have been made; but always with deplorable results. The present situation in one of our largest

American cities can be traced, in part, to well meant but ignorant efforts in this direction. The application of psychology is needed; but we need first the training of a considerable number of psychologists for this work, in which at present practically no psychologists are engaged. The work itself, must commence experimentally, under the direction of scientific men."

Dr. Dunlap branded as "good for nothing" a great deal "of what passes for psychology today."

"Anybody with nothing more than a stock of fine-sounding phrases can set himself up as a psychologist," he declared, "and a great many persons with no more equipment than a desire for notoriety or for money do thus set themselves up. We have had a great many self-styled psychologists giving courses at so much per head, in topics ranging from how to develop your personality to theories of soul-vibrations, and some of these have swindled the gullible public out of large sums of money. We have had psychoanalysts posing as psychologists and writing popular books of wide circulation telling all about complexes and repressions and other bunk, some of which is merely stupid, and some of which has done great harm. It can be certified that practically all

psychoanalysts who write popular books or articles know very little psychology, and their nostrums are as worthless or dangerous as the patent medicines sold in bottles.

Best Psychologists Are Cautious

"The only psychology which is good for anything is the product of psychologists connected with universities or reputable scientific institutions, and these men are cautious about putting out popular instructions, because psychology of the scientific sort is a very difficult subject, and the most important parts of it can not be successfully applied to any problem or case except by an expert of broad and intensive training, or under his direct supervision.

"Not all legitimate psychologists are reliable experts, any more than all doctors are reliable, but just as you find reliable doctors only among the qualified men, so the reliable psychologists are found only in the ranks of those who conform to certain standards. . . .

"The great field in which psychology is being applied today is that of personal adjustment," Dr. Dunlap stated. "People who are badly adapted to their social and economic environments: who are peculiar, or inefficient: who are not getting what they should out of life, and who are not able to do their work properly, are legion. Some of these people are really mentally diseased, and are in need of psychiatric care. The vast majority, however, do not need a psychiatrist, but a psychologist. Just one narrow stretch of the field will illustrate. In many cases, a disintegrating family, headed for the rocks, is saved by the advice of a psychologist. Sometimes children who are becoming morbid may be saved by treatment of the parents. Sex perversions, if not of too long standing, may be cleared up by psychological treatment. In another minor field, that of stammering and similar speech defects, while little of value has yet been done, we have gone far enough to see that much may be done if a sufficient number of properly trained psychologists apply themselves to the job."

European Cities Cleaner Than American

Sanitation

AMERICAN cities lag behind European ones in the matter of cleanliness and efficiency of refuse collection and disposal, Dr. George A. Soper found in a recent survey of the situation here and abroad.

Munich, Germany, was the cleanest city, Dr. Soper said, although several other German cities closely approached its high degree of cleanliness.

Dustless refuse collection systems being used in Germany, Austria, Czechoslovakia and England are a new and remarkable development, Dr. Soper reported.

The cooperation of all the citizens in keeping the cities clean was everywhere apparent and it is this cooperation which must be the keynote in any plan for municipal cleanliness. It ranks above the mechanical develop-

ments, it appears from the report.

Gutter flushing is a useful European procedure which is seldom practiced in America. In Paris it is done with a large amount of water and seems almost indispensable. In Dresden there is a different technic using less water but apparently operating as efficiently.

Another European custom novel to American city dwellers is the practice of the street-cleaning department of cleaning the sidewalks as well as the pavements, except during snowy seasons when the householder does it.

This plan might well be followed in New York, Dr. Soper suggested. The sidewalk is really a part of the street and there is no good reason why its care should be left to the householder.

Science News-Letter, August 2, 1930

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in the daytime, for of course there are as many meteors during the day as at night, only we do not see them.

Many meteors, particularly members of some of the main streams which give us the annual showers, follow the same orbits as do certain comets. For instance, the Perseids, of which we have spoken so much, follow Tuttle's Comet. The Leonids, the most famous stream of all for they give the "great showers" as of 1833, when it was said "the stars fell," follow the path of Tempel's Comet; the Bielids that of Biela's Comet, the May Aquarids that of Halley's Comet, etc.

Comets Make Meteors

This connection between comets and meteors has proved of great importance in our study of the former, for we are quite sure that the nuclei or central parts of the heads of comets consist of nothing other than meteorites. And when a comet disintegrates, which apparently will be the ultimate fate of all comets, its debris simply becomes meteors. Hence the Mazapil meteorite which fell during a shower of Bielid meteors in 1885 is rather confidently spoken of as a part of Biela's Comet.

The study of meteors from the observational standpoint takes up so much time that professional astronomers cannot spare enough from their great telescopes to do much on meteors. Hence their actual observation is rather largely left to amateurs. In this country we have a flourishing organization known as the American Meteor Society, formed mostly of amateurs, but with some professional astronomers also. The headquarters is at the Flower Observatory of the University of Pennsylvania, of which the speaker is director. All the members send to us copies of their observations which are then carefully worked up and the results published at intervals. In this way we are able to coordinate and discuss the work more fully than any individual could do, using only his personal observations and experience.

Besides our regular members we aim to secure the help of all others, even temporarily interested. Such observers cannot, as a rule, send in as complete observations as our trained members, but they can do something very useful indeed. This is to help us get the hourly rates of all meteors,

from widely scattered stations. From such data we are able to deduce a true picture of the density of the cross section of the meteor stream, and tell more about it generally.

To do this one should choose a favorable place, and provide himself with a watch, notebook, flashlight and pencil. Then, watching as large an area of the sky as possible he should count every meteor certainly seen during each half hour. As each interval is up, the record should be made in the notebook, along with notes as to any changes in the sky like passing clouds, etc., or any especially fine meteor seen. The watching should be done toward one direction only, during each half hour. What direction it is should be recorded. If desired, other directions may be chosen for other half hours. No meteor should be counted unless seen with certainty. Full notes as to condition of the sky should always be made.

Such records, conscientiously made by intelligent people, over periods of two or more hours near the dates of maximum of the Perseids, for instance, have a real value as explained above. When reported to us, they are published in due time, proper acknowledgments being made to each contributor, by name, in the publication. We also desire all observations of any very bright meteor, casually seen, no matter on what night.

For those who would like to take part in more detailed observations than those briefly outlined, a request mailed to the Flower Observatory, Upper Darby, Pa., will bring a bulletin with further instructions and descriptions of the work of the American Meteor Society.

Great Showers Coming

Finally, it is quite possible, if not probable, that 1932, 1933, or 1934 may see the Leonids return in sufficient strength to give again one of the truly great meteoric showers. They come about the middle of November. As world-wide preparations will doubtless be made for their observation, we desire some years ahead to interest and train a large corps of volunteer observers, who will be available if indeed a magnificent display should appear. This is an added reason for the increasing attention being paid to meteoric astronomy.

Science News-Letter, August 2, 1930

Germ-Killer May Wipe Out Cholera

Public Health

India To Study Immunization With Bacteriophage

PLANS for wholesale immunization against cholera, by which whole towns may be protected from the dread disease of the Orient, are now being considered. These plans are based on recent investigations with the bacteriophage, or germ-killer, taken from patients getting over an attack of cholera. If the plans prove practical, there may soon be a time when entire communities can be immunized against Asiatic cholera and epidemics of that disease may cease.

The Indian Government has invited Prof. F. d'Herelle of Yale University, discoverer of the bacteriophage, Major R. H. Malone, officiating director of the Pasteur Institute at Kasauli, and Dr. M. N. Lahiri to investigate the new discovery that bacteriophage, which is virulent for the cholera germ when taken from a convalescent cholera patient, acts as a prophylactic when administered to the uninfected and as a remedy for those who have already contracted the disease.

Bacteriophage, it is thought, is a normal inhabitant of the intestine and is a parasite on the microorganisms

found there. It was discovered after an epidemic of cholera that as soon as the bacteriophage from convalescent patients became diffused through natural means into the water used by the community, the epidemic ceased. This is the fact that the scientists are using as a basis for their investigations. Their suggestion is that potent strains of bacteriophage be grown deliberately and these cultures be introduced directly into the wells, thus immunizing whole communities at one time.

As a remedy when the individual has contracted the disease the bacteriophage has been found very efficacious, it is claimed. If it was given within six hours of the first symptoms, there were no deaths; if administered between six and twenty-four hours the mortality rate was 10.2 per cent. but after twenty-four hours the rate rose to 14.3 per cent.

The bacteriophage is said to be entirely harmless when given by mouth. There is a special warning that it should never be administered by injection under the skin.

SPECIAL orders to quarantine officers in Manila and on the west coast of the Philippine Islands have been issued by the U. S. Public Health Service in order to prevent any spread of cholera from the Philippine Islands to this country. Eight hundred cases have been reported unofficially from the Philippines, although the official figures are considerably lower than this.

Passengers for the United States are not allowed to board vessels at Manila unless bacteriological tests have shown them to be free of the germs of this disease. If these tests are not made, the passengers must be kept under observation for five days before sailing. Quarantine officers here are ordered to be on the watch for cases of the disease in vessels arriving here from the Philippines.

Cholera is a highly fatal disease, and is fairly common in the Orient, particularly in India where there are always some cases of it. The germs of the disease are spread in drinking water.

Science News-Letter, August 2, 1930

Ancient, Not Prehistoric, Relics Found

Anthropology

INDIAN relics of probably ancient date, though not of the age usually thought of as "prehistoric," have been dug out from under a series of dunes on the margins of Oso Creek lagoon near Corpus Christi, Texas, by Prof. E. H. Sellards, University of Texas geologist who conducted the investigation on behalf of Science Service. Prof. Sellards was interested in the possibility of finding evidences of early human occupation by flint implements discovered there by W. Armstrong Price of Corpus Christi, Texas.

In a telegraphic report to Science Service, Prof. Sellards stated:

"The evidence of early human habitation consists of worked flints, chips and spalls buried in clay dunes. These dunes are made by slow accumulation of dust particles blown from the flat bottom of the lagoon when it goes dry. The lagoon usually contains water, but is occasionally dry in midsummer. These conditions are intermittent.

"These spells of dryness must have been recurring for a long time, because dunes from ten to fifteen feet in height have accumulated at the west margin of the lagoon. At the present time the lagoon is dry and the dune-building process may be seen in operation.

"The artifacts are found to a depth of six feet or more, and with them there are many seashells. As the dunes were being slowly built men living on them brought in sea-food, including oysters, conches, and scallops, leaving their shells to lie when they ate them. Storms also occasionally washed shells across the dunes.

"Fossil bones found in the dunes represent deer, wolf and other animals of the present time. For this reason it is thought that the period when man lived there was recent in the geologic sense, although as shown by the slow building of the dunes it must have been several centuries ago.

Science News-Letter, August 2, 1930

Oiling Eggs

EGGS with oil-soaked shells may become standard articles of commerce as a result of a series of experiments performed by T. L. Swenson and H. H. Mottern of the U. S. Department of Agriculture.

They treated eggs with two different types of oil, both at ordinary atmospheric pressure and in a vacuum, and then kept them for ten days at a temperature of 98 degrees Fahrenheit, weighing them at regular intervals to determine the rate of shrinkage of the contents.

It was found that untreated eggs lost about 13 per cent. of their total weight during the ten-day period, eggs dipped in mineral oil at atmospheric pressure lost 2 per cent., while eggs dipped in aluminum soap oil under vacuum lost only one-half of one per cent.

Chemistry

Science News-Letter, August 2, 1930

NATURE RAMBLINGS

By Frank Thone

*Some Like It Hot*

THE next time you stop in front of the bear-pit in your favorite zoo, do not waste any pity on the polar bears, as sufferers from unaccustomed heat in the far southern land of their captivity. Polar bears really like hot weather, declares George Jennison, a well-known and widely experienced English zoologist. He writes:

"The public err profoundly with regard to Polar Bears. They are pitied in hot weather, while a severe spell of frost always calls forth the remark that the Polar Bears will enjoy themselves; actually they do not like the cold. They rarely enter the water between October and February, and, on the other hand, nothing pleases them so much as hot weather, when they will lie flat with all four feet extended, enjoying the blazing sunshine. In the Arctic, radiation from the white snow is extreme and the heat terrific. Carl Hagenbeck has seen Polar Bears stretched out to enjoy sunshine that gave Leopards heat apoplexy."

Right now, therefore, rather than in winter, the big white bears are getting the most out of their lives. Above the Arctic Circle the sun is shining all day and all night, and the only way you can avoid its glare, even at midnight, is to get around on the north side of a big rock. Add to this fact that during the summer the Arctic teems with animal life, for migratory birds have swarmed northward to breed, and there are plenty of seals in the water. So the polar bear has nothing to do but stuff himself and bask in the sun. An he can do either at any hour of the twenty-four.

Science News-Letter, August 2, 1930

Italian Earthquake One Of Many

Seismology

THE SEVERE twisting by earthquake of Italy's ankle with loss of life and property is not a new experience for that country of seismic disturbances and volcanic eruptions. For sunny Italy is in the same class with Japan and America's own west coast when earthquakes are considered.

The shock that centered in the Naples region with its area of greatest disturbances probably located inland in about the middle of the Italian boot was recorded on seismographs throughout this continent and Europe. With the aid of seismic data telegraphed to Science Service from Canadian observatories at Ottawa and Victoria; Fordham University, New York City; St. Louis University; Georgetown University, Washington, D. C.; and J. W. Shaw's private seismograph at West Bromwich, England, experts of the U. S. Coast and Geodetic Survey and the Jesuit Seismological Association were able to locate accurately the center of the earth disturbance without use of reports that later filtered through interrupted communication lines in Italy to the outside world.

The scientific computations show

that the shock centered at between 14 and 15 degrees east longitude and 41 degrees north latitude which is slightly east of Naples. This area is considered by seismologists on the basis of past records to be one where earthquakes are frequent and strong.

Some 450 earth shocks occur annually in Italy, although major disasters come at intervals of years. Naples in 1857 experienced a quake that took 12,300 lives. The Messina shock of 1908, that killed more than 100,000, set a European record for earthquake losses. The earthquake of central Italy in 1915 cost 30,000 lives and the region of Calabria in Italy's toe lost 30,000 in the shock of 1783, 100 in 1894 and 175 in 1907.

Five hours earlier than the Italian earthquake another seismic shock, also felt round the world, shook the ocean bottom of the North Pacific, north of Japan and east of the Siberian coast. This shock probably caused no loss of life in spite of its severity, but it was located promptly and definitely by instrumental data from seismological observatories wired to Science Service.

Science News-Letter, August 2, 1930

Phenol Now Blamed For Gin Paralysis

Physiology

A SUBSTANCE related to carbolic acid is probably the adulterant which caused thousands of cases of paralysis from drinking Jamaica ginger last February and March.

A phenol compound, probably the phosphoric acid ester of tricresol, is the substance which Dr. M. I. Smith of the U. S. Hygienic Laboratory, working with the Prohibition Bureau, found in samples of the ginger from shipments that had caused cases of the paralysis. Samples from shipments thought but not definitely known to have caused paralysis, also contained this substance. Samples from lots that did not cause paralysis did not contain any of the phenol compound.

Samples from the first two classes of shipments were fed to rabbits, monkeys and dogs. The monkeys and dogs were not affected, but the rabbits became paralyzed in the limbs and died of respiratory failure.

An adulterated fluid extract of ginger was made in the laboratory to resemble the ginger that had caused the paralysis outbreaks in human beings. This extract contained tricresyl phosphate, the suspected compound. It had the same effect on the animals as the samples of the ginger which were known or thought to have caused the human disease.

The government scientists were at a loss to explain why the monkeys and dogs were not affected by the ginger samples, but they found that paralytic symptoms could be produced when the suspected phenol compound was broken down chemically before being given to the dogs and monkeys. This suggested that the compound passed through the stomachs of these animals unchanged, while in the stomachs of rabbits and of man it was broken down into a poisonous substance.

Science News-Letter, August 2, 1930

FIRST GLANCES AT NEW BOOKS

A GERMAN-ENGLISH TECHNICAL AND SCIENTIFIC DICTIONARY—A. Webel—Dutton, 887 p., \$10.50. If there is any truth in the claim that good wares sell themselves, then in a few months this book will be in every science department in our colleges and universities, on the desks of all the charitable language professors who offer courses in scientific German for struggling graduate students, in the cubicles of all such graduates as can possibly afford it, and on library shelves of every description. This dictionary works in only one direction, from German to English; but that is the way most of us want to go. It contains most of the German words found in ordinary translation-dictionaries, plus thousands of scientific terms found nowhere else: *Pecheisenerz*, for example, and *Relaissschaltung*, *Schwefelweinsäure* and *Zauberwurzel*. Every German chemical name has its formula appended, as well as its English translation, and every German common name of a plant is followed by the botanical as well as the English common name. In addition there is a special botanical section of 142 pages, listing the Latin names of plants alphabetically and giving with each its common German and English names. There is also a 13-page section listing all those German abbreviations that we often find troublesome, like *a.a.O.*, *Erg.-Bd.*, *m.b.H.*, *u.s.w.*

General Science

Science News-Letter, August 2, 1930

EXPLORING FOR PLANTS—David Fairchild—Macmillan, 591 p., \$5. Ever since venturesome Greeks pulled galley oars seeking the golden apples of the Hesperides, there have been men whose desire of the eye and of the lips has been for new trees and strange fruits. Of this ageless company David Fairchild is a past and accepted fellow. He has ranged through the earth, very literally from China to Peru, always bringing or shipping home his living loot to the gardens of his native land. Herein he tells tales of his wanderings so that we may share with him some of the thrill of discovery. Later we shall probably eat, wear or use some of the things he has sent home for our benefit.

Botany

Science News-Letter, August 2, 1930

IMPROVE YOUR MEMORY—Bertrand Lyon—Lothrop, Lee, and Shepard, 252 p., \$2.50. A sensible book is this which harps on no one "system" of memory training but stresses various psychological principles. The book becomes a memory course in itself, for at the end of each chapter the reader is faced with questions about the chapter and about other matters, which he can answer and thus check up on the state of his own memory. Presumably, if he keeps a notebook as advised and follows up the suggestions in the book, he should be able to report to himself improvement in his memory as he advances from chapter to chapter.

Psychology

Science News-Letter, August 2, 1930

TOMORROW'S AMERICANS—A. O. Bowden and Ida Clyde Clarke—Putnam, 200 p., \$2. The authors advocate student self-government, stressing why and how self-government serves to prepare the younger generation for citizenship. In explaining how self-government may be practically established, various objections are answered and specific plans which may be put into operation are presented.

Education

Science News-Letter, August 2, 1930

AN INTRODUCTION TO VERTEBRATE EMBRYOLOGY—H. L. Wieman—McGraw-Hill, 411 p., \$4. All who aspire to the medical profession must study embryology as a matter of working equipment. All other educated persons should study it as an obedience to the ancient command, "Know thyself." Although this new text book is entering a field already fairly well occupied, it will find a place for itself because the author knows how to present his facts in clear and straightforward fashion and how to illustrate them with simple diagrammatic drawings.

Embryology

Science News-Letter, August 2, 1930

COLLEGE TEXTBOOK OF GEOLOGY: PART II: HISTORICAL GEOLOGY—Thomas C. Chamberlin and Rollin D. Salisbury—Holt, 525 p., \$3.75. A revision of one of the classics of American geology, by R. T. Chamberlin and Paul MacClintock.

Geology

Science News-Letter, August 2, 1930

MACHU PICCHU—Hirman Bingham—Yale Univ. Press, 244 p., \$50. "It seems probable, therefore," writes Dr. Bingham toward the close of this book, "that at Machu Picchu we have not only the ruins of Tampu-tocco, the cradle of the Incas, the birthplace of Manco Ccapac, the first Cuzco Inca, but also the ruins of Uillca-pampa, the sacred city of the last Cuzco Inca, the 'university of idolatry,' and the home of a considerable number of the Virgins of the Sun and attendant priests." These conclusions as to the significance of Machu Picchu are reached as a result of discoveries made in expeditions of 1911, 1912, and 1915, which the author directed for Yale University and the National Geographic Society. Dr. Bingham considers that his finds bear out and dovetail with some of the statements by Montesinos, a seventeenth century chronicler whose version of affairs in ancient Peru has been generally regarded as of doubtful value. Before Dr. Bingham's concluding chapter on the builders of Machu Picchu, he sets forth a sober and impressive recounting of the discoveries won by his Peruvian expeditions. There are chapters on the Andean highlands with special reference to the Incan roads and chapters on architecture, pottery, burials, and metallurgy.

Archaeology

Science News-Letter, August 2, 1930

AMERICAN AIRPORT DESIGNS—Lehigh Portland Cement Company—Taylor, Rogers & Bliss, 96 p., \$3. With some 3,000 airports building or planned, the construction of these terminals of the latest transportation method promises to be a major building activity during the next few years. The designs of the Lehigh Airports Competition will furnish many suggestions to the architects and constructors who must solve the problem of providing airplanes with proper resting places.

Aeronautics—Architecture

Science News-Letter, August 2, 1930

MAGICIAN AND LEECH—Warren R. Dawson—Methuen, 160 p., 7 s., 6 d. A concise but comprehensive account of ancient Egyptian medicine written after a study of the original texts, the famous medical papyri.

History of Medicine

Science News-Letter, August 2, 1930

Announcing

Science  Service

Nation-wide Radio Network Broadcasts for August and September

Columbia Broadcasting System
EVERY FRIDAY AFTERNOON, 3:45-4:00 P. M.
(Eastern Daylight Time, While in Effect)

Aug. 8

"Weather and Aviation"

Dr. W. J. Humphreys, professor of meteorological physics, U. S. Weather Bureau.

Aug. 15

"Fighting Forest Fires"

Mr. H. N. Wheeler, U. S. Forest Service.

Aug. 22

"Light and Green Plants"

Dr. John M. Arthur, The Boyce Thompson Institute for Plant Research.

Aug. 29

"Mental Hygiene"

Dr. William A. White, Superintendent, St. Elizabeth's Hospital, Washington, D. C.

Sept. 5

"Tropical Hurricanes"

Mr. C. L. Mitchell, principal meteorologist and district forecaster, U. S. Weather Bureau.

Sept. 12

"Industrial Revolutions"

Mr. Watson Davis, managing editor, Science Service, Inc.

Sept. 19

"Heredity and Environment"

Dr. A. F. Blakeslee, assistant director, Station for Experimental Evolution, Carnegie Institution of Washington.

Sept. 26

"Uncle Sam Watches His Animals"

Dr. Paul G. Redington, director, U. S. Biological Survey.

From thirty to forty stations of the Columbia System will broadcast these talks to American listeners and two short wave stations, W2XE in New York City and W3XAU in Philadelphia, will carry them to distant foreign countries.

If the program of your nearest Columbia station does not list these talks, ask that they be added.

With the cooperation of the Columbia Broadcasting System, Science Service began last March to broadcast each week through a nation-wide hook-up an address by a prominent scientist. Only outstanding men in their fields are obtained for these programs and interesting and important subjects are chosen. The talks have been well received and Science Service is glad to announce the program for the coming two months.

In addition to the weekly nation-wide broadcasts, about twenty-five radio stations in different parts of the country give every week a fifteen-minute talk on "Science News of the Week" under the auspices of Science Service. These talks are prepared by members of the Science Service staff, writers who have been trained both in the laboratory and in editorial rooms. Probably one of these stations is near you.

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